TAB

TYPICAL CURRICULUM

DEPARTMENT OF DEFENSE COMPUTER INSTITUTE
INTERMEDIATE EXECUTIVE COURSE

FIRST WEEK

Monday

0800   Welcome. A welcome to persons attending the DODCI Intermediate
Executive Course in automatic data processing.

Course Introduction. An overview of the course; its content,
objectives and participation by those attending.

0900   Survey of Computers. Brief description of the general characteristics
of digital and analog computers. Method of classifying digital and
analog computers and general description of each class.

1000   Number Systems. Provides an understanding of the basis for
communicating with computers. Discusses the properties of and
manipulation of the decimal, binary, and octal number systems.
Provides a background for understanding binary codes and programming.

1100   Computer Fundamentals I (Organization). A discussion of the five (5)
basic sections of a digital computer with an explanation of the function
and fundamental operation of each important component.

1200   LUNCH

1300   Introduction to Computer Instructions. The theory of instructing a
computer. An example of a computer program, examined from the
computer's point of view, serves to provide a basis for the operation
of a computer cycle, the meaning of instruction formats and a general
description of computer instructions by computer function.

1400   Computer Fundamentals II (Info. Flow). A discussion of the
organization of the components and sections of a digital computer
with particular attention to the interactions and interconnections to
effect control and information flow thru the computer.

1500   The Programming Process. Step-by-step development of items needing
consideration when problems are to be solved on digital computers.
The roles of the customer, problem analyst, and programmer in the
programming process. Discussion of problem formulation, program
testing, program debugging, and production runs. The Flow Diagram
as a language and as a tool for problem solving.

1600   Flow Charting Concepts. Amplification of the problem analysis phase
of the programming process. A sample problem will be analyzed for
the computer solution. The tools of the analyst are examined and
explained.

Tuesday

0800   Contracting. The similarities and differences between contracting for hardware and software will be discussed. The use and purpose of GSA's Federal Supply Schedule Price Lists for hardware will be covered as will the various types of software contracts.

0900   Security. Considerations involved in protecting classified information used in ADP process. Floor plans for ADP Installation. Magnetic tapes, disks and drums. Protection of ADP signals from unauthorized detection or tampering; equipment communication, input/output devices.

1000   Standardization. Interfaces now and in the future among ADP systems within the Department of Defense, and among ADP systems external to DOD. The various kinds of standards and compatibilities that are needed. Disadvantages encountered and to be encountered from inability to meet fully the needs for standardization and compatibility.

1100   Computer Application. Operational ADP application by selected guest lecturer.

1200   LUNCH

1300   System Design Process. An historical look at the design of data systems describes the evolution of the process. The activities of data systems design are related to analysis activities and certain methodologies for accomplishment are discussed.

1400   Case Problem Outputs Design. The information requirements described in the case problem are defined. These requirements are expressed in terms of discrete outputs which are then described in terms of the data elements involved, etc. Examples of output design documentation will be provided.

1600   Group Discussion.

Wednesday

0800   Real Time Systems. Definition of a real time computing system.
        Overview of the general characteristics of real time systems,
        survey of the equipment and programming complexities present
        in a typical real time computing system. Equipment complexities
        of real time systems including displays, input/output requirements,
        communications terminals and computer memory requirements.

1000   Tactical Data Systems. A discussion of the operational capabilities
        and limitations of currently operational tactical data systems.
        Emphasis will be on the problems associated with the use of the
        computer in a tactical military environment. The similarities and
        differences between ATDS, MTDS, NTDS, and 407L will be briefly
        covered.

1100   Computer Application. Operational ADP application by selected
        guest lecturer.

1200   LUNCH

1300   Data Base Design. A discussion of the terminology of data hierarchy,
        concepts to be considered in organizing, formatting, and actually
        creating the data base for a large data processing system. Machine
        oriented descriptions of files, records, and data elements are also
        provided.

1400   Case Problem: Data Base Construction. The actions and thought
        processes necessary to determine a way to construct a data base
        for the case problem are described. Examples of documents used
        to define and describe the contents of a data base will be provided.

1600   Group Discussion.

Thursday

0800 Time-Shared Systems. To provide an understanding of the concepts of time-shared systems. To provide an appreciation of the hardware and software techniques in use and under development for implementation of time-shared systems.

0900 Operations Research and Simulation. The function of Operations Research will be discussed, including its relationship to the areas it supports. In addition, using examples, some of the methods used will be explained. There will be included a definition and general explanation of simulation with the use of computers. Example of simulation applications performed in the Headquarters, USAF Data Services Center.

1100 Computer Application. Operational ADP application by selected guest lecturer.

1200 LUNCH

1300 Case Problem: Inputs Design & Conclusion. A description of the final actions of designing a data processing system. The actions required to determine the data necessary to create and maintain the data base are described. Sample documentation will be provided.

1500 Course Summary and Discussion. Summary of the materials covered during the course. Discussion by students and clarification of any problem areas. Comments on subject matter of greatest interest.

Friday

0800   <u>Preparation for Installation</u>. Provides executive level students with the factors to be considered in preparing for the installation of an electronic data processing system. Duties of the Installation Task Force. Provides checklists to be used as management tools in ensuring that all pertinent factors have been considered in site selection and preparation. Emergency planning-alternate sites and files. On-site readiness reviews.

0900   <u>System Conversion</u>. Converting to a new ADP system is a major activity throughout the government and private industry. This lecture provides an understanding of the methods and problems of converting to a computer-based system with particular emphasis on the programming requirements when going from one computer to another.

1100   <u>Executive Routines</u>. Need for, development, and significance of executive routines. Description of and purposes for individual components of executive routines.

1200   LUNCH

1300   <u>Case Problem Introduction</u>. A case problem has been developed to serve as the basis for completely describing the activities of data systems analysis and design. The case situation is quasi-realistic; assumptions and decisions are for the purposes of making the problem manageable as a teaching vehicle.

1400   <u>FORTRAN</u>. This two-hour session deals with the FORTRAN IV language. Basic features of the language, operations of arithmetic, input and output, and format control are discussed. Application of the foregoing will be handled in the laboratory.

1600   <u>FORTRAN Laboratory</u>. Programming laboratory in which the students write a computer program in the FORTRAN programming language. The problem is compiled and run on a large computer.

SECOND WEEK

Monday

0800   Systems Operations. Tasks involved in keeping a system operable. Performance criteria for new ADP systems. Methods used to review ADP processes.

0900   Information Storage & Retrieval. Description of the need for information storage and retrieval systems (IRS). Definitions of automated and non-automated systems. Approaches to the design of automated IRS with an example of an operational system.

1000   ADP Personnel. A review is provided of the "people" aspect in automatic data processing, particularly those working in a computer installation. ADP Personnel classification, organization, duties, performance, standards, selection, training and retention are discussed in the light of a need for sound personnel management practices.

1100   World Wide Military Command & Control System (WWMCCS). The mission, background, and elements of the WWMCCS are discussed. Specific attention is given to the National Military Command System (NMCS) and its ADP plans.

1200   LUNCH

1300   Analysis Process. A discussion of the history, methods and objectives of the activities called systems analysis. The necessity for a team to accomplish the actions, the composition of the team, the support to be provided and concepts of managing the efforts are discussed.

1400   Case Problem Analysis. The students will be guided through the actions required to analyze the case problem. Examples of analysis documents will be provided.

1600   Group Discussion.

Tuesday

0800   Survey of Applications. The Department of Defense uses computers for many different functions. This lecture provides an understanding of why computers are used in various areas of DOD with illustrative examples of the specific jobs they perform. References are made to publications where additional information may be found about military applications.

0900   Computer Logic. Description of the basic building blocks of a computer, AND gate, OR gate and Flip-Flop circuits. Examples showing design techniques of an adder, a decoder, and simple control gates using a truth table approach.

1000   Peripheral Equipment. A summary review of the characteristics of peripheral equipment devices. A discussion of the elements of buffering input/output operation.

1100   CODES. The techniques of data processing that allow computers to process data other than pure numeric data are described. Several different machine codes are examined and the concepts of media codes, data codes and encoding for the computer environment are discussed.

1300   Computer Instructions Repertoire. Explanation of purpose and use of Digital Trainer instructions.

1400   Program Coding. Concurrent writing of machine language program for a typical problem, utilizing a previously developed flow diagram.

1500   Digital Trainer Laboratory. The laboratory sessions provide the student the opportunity to develop computer programs in machine language for a small desk top computer. The students actually engage in the computer operations to the point of manually loading at least one program. Principles of the looping sequence and arithmetic address modifications of instructions are stressed. The students also gain firsthand exposure to computer operations when an executive routine is employed.

Wednesday

0800   The Systems Development Cycle. The elements of data systems are described and the types identified. The systems development cycle is explained together with the method used in the course to treat these concepts.

1000   Computer Selection. The DOD agencies and directives controlling computer acquisition are identified and their operations and interactions are briefly explained. The actual activity of selecting from several computer systems is examined in some detail.

1200   LUNCH

1300   Problems of Numerical Operations. Problems specifically associated with numerical operations in a computer are explored. Details about techniques for overcoming problems arising because of the digital nature of the computer are discussed. Examples of computer arithmetic, complement arithmetic, and an explanation of an unsolvable tradeoff situation are provided.

1400   Subroutines & Service Routines. A discussion of the advantages and characteristics of Subroutines and Service Routines: how they are obtained and used.

1500   Digital Trainer Laboratory.

Thursday

0800   Source Data Collection. A brief examination of the needs for source data automation, and the current state of hardware technology. An overview of a current project in this area is presented.

0900   Legal Implications of ADPS. The widespread use of computers requires that the legal effects of their operation be considered both at the system design stage and during day-to-day operations. The session covers four legal aspects: (a) Acceptability by the courts of machine records and machine outputs under the rules of evidence; (b) Audit trails and the prevention of unauthorized inputs and outputs; (c) Copyright and patent protection for computer programs; and (d) Future implications: "discovery of evidence" procedures and "negligence law" governing operations of ADP systems.

1000   Data Communications. Communications facilities available and planned for support of ADP systems. The capabilities, limitations of communications equipment in support of Automatic Data Processing Operations.

1200   LUNCH

1300   Assembly Languages and Assemblers. The reasons underlying the development of assembly languages and the significant characteristics of assembly language vs. machine language programming are discussed. The assembly process is described and the basic operation of a one pass assembly program is explained. The costs attributable to assembly language programming are identified.

1400   Higher Level Languages. The power of higher level languages as used in the programming process is explored. The programming process utilizing these languages is examined with particular attention to the functions of the compiler. A historical survey of higher level languages is provided and is followed by general guidelines pertaining to choosing or not choosing a higher level language for the programming process.

1500   Digital Trainer Laboratory. Preceded by a brief analysis of the "Sort Problem," and techniques of sorting, prior to actual solution and programming by the student.

Friday

0800   Foreign Computer Technology. A presentation on the state-of-the-art in various countries. Special interest is focused on the U.S.S.R.

0900   Future. A partial summary of present day state-of-the-art in computer technology with some implications of its effect on the future.

1030   ADP Management in the Federal Government. An overview of the growth of ADP in the Federal Government; capital investments and annual costs. Resulting requirements for management of these resources. Survey of actions taken in recent years by Congressional Committees, the General Accounting Office, the President within the Executive Branch, seeking improved management policies and practices. Legislation recently enacted and actions which are most likely to be taken as a result thereof.

1200   GRADUATION

Friday